View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by University of Johannesburg Institutional Repository

Securing benefits for local communities from international visitors to the Kgalagadi Transfrontier Park

Johane Dikgang (**corresponding author**)

Public and Environmental Economics Research Centre, Department of Economics and Econometrics, University of Johannesburg, South Africa

Tel. + 27 (11) 559 2017, Email jdikgang@uj.ac.za

Edwin Muchapondwa

Department of Economics, University of Cape Town, South Africa

Department of Business Administration, Technology and Social Sciences, Luleå University of Technology, Sweden

Tel. +27 (21) 650 5242, Email Edwin.Muchapondwa@uct.ac.za

Jesper Stage

Department of Business Administration, Technology and Social Sciences, Luleå University of Technology, Sweden

Tel. 46 (920) 49 34 45, Email Jesper.Stage@ltu.se

Acknowledgements. We are grateful to Louise Swemmer, Wendy Annecke and Joep Stevens of SANParks (South African National Parks) for assistance with data and materials. Funding from ERSA (Economic Research Southern Africa), FORMAS through its COMMONS programme and Sida (Swedish International Development Cooperation Agency) through its Environment for Development programme is gratefully acknowledged. An earlier version of this article appears as ERSA *Working Paper 393.* Sandie Fitchat provided valuable help with language editing. The usual disclaimers apply.

Abstract

This paper estimates the visitation demand function for Kgalagadi Transfrontier Park (KTP) in order to determine the scope for raising fees charged to international tourists in order to fund revenue-sharing schemes for local communities. International and Southern African Development Community tourists account for approximately 25% and 2% of the total number of visitors to South African national parks, with domestic visitors making up the remaining portion. Though small, the South African international tourism market is mature, and accounts for a disproportionately large share (around 42%) of net revenue. To estimate visitation demand at the KTP and three other national parks, random effects Tobit Model was used. Using the estimated elasticities, the revenue-maximising daily conservation fee was computed to be R1 131.94 (US$144.20) for KTP, which can be compared with the R180 (US$22.93) currently charged. Furthermore, the study also demonstrated that there is a possibility of raising fees at the other three parks. Sharing conservation revenue with communities surrounding parks could demonstrate the link between ecotourism and local communities' economic development, and promote a positive view of land restitution involving national parks.

Keywords: benefit-sharing, conservation fee, demand, international visitors, land claim, national park.

JEL CODE: Q15, Q24, Q26, Q50

1. Introduction

South Africa has been experiencing a significant increase in international visitors for some time now, due in large part to the uniqueness and attractiveness of its 22 national parks, run by South African National Parks (SANParks).[1] The top five markets for South African parks are Netherlands, Germany, France, United Kingdom and the United States making up the top five. According to SANParks (2016) this was achieved despite incremental increases in conservation fees[2] over the years. South African residents account for approximately 73% of total number of visitors to national parks, with Southern African Development Community (SADC) and international visitors making up 2% and 25% respectively. SADC visitation numbers are around 15% down compared to previous financial year, while international visitation is 2% higher compared to previous year.

The South African international tourism market is mature, and accounts for a disproportionately large share of net revenue. According to J Stevens, the General Manager of Strategic Tourism Services at SANParks (personal communication, March 27, 2017), a breakdown of SANParks' 2015/16 net revenue from conservation fees indicates that SADC and international tourists accounted for less than 1% and 42%, respectively.

Conservation fees at national parks were imposed when the first national park, Kruger National Park, was proclaimed in 1926.[3] The current SANParks pricing structure was introduced in 2003. Following the implementation of the revised pricing policy, conservation fees now vary among parks, and distinguish between South African residents, SADC residents, and residents of the rest of the world. One of the motivations for a nationality-based price strategy in favour of domestic nationals was that domestic residents contribute towards taxes from which SANParks receives state funding. Unlike in the past when fees were the same across the 22 national parks managed by SANParks, fees now vary more and variation in fees may be one of the criteria when tourists decide what parks to visit. Therefore, conservation fees may significantly influence decision on which park to visit, in addition to traditional drivers

[1] SANParks is the overarching government agency responsible for national conservation in South Africa.
[2] The term *conservation fee* was officially adopted effective 2 April 2003 in place of *admission/entrance fee* because the former better describes the parks agency's mission more appropriately (McKinsey & Company, 2002).
[3] The records from Kruger show that the three cars that visited the park in 1927 were the first to be charged conservation fees, namely £1 each (equivalent to R2 each at the time).

such as park attributes, income and other demographics factors. The physical sizes of the national parks, the sizes of their workforces and the numbers of visitors who go there all have an effect on the cost of running them, hence the rationale for differences in their conservation fees.

Notably, conservation fees are payable for any portion of a day spent inside a park – even though, for easier administration, for overnight visitors such fees are actually paid for every night spent inside it. Nonetheless, it is unclear what criteria are used to determine conservation fees; prices at South African national parks have been increased occasionally after 2003, but there seem to be few or no formal criteria for determining their levels.

As part of South Africa's land restitution programme, local communities have lodged successful land claims affecting six national parks. The government has taken the view that land claims must be resolved in the national interest by taking into consideration the intrinsic biodiversity value of the land, and seeking outcomes that will combine the objectives of restitution with conservation (Dikgang & Muchapondwa, 2012). The finalization of the Khomani San and Mier community land claim in May 2002 resulted in a drastic change in land ownership and land use choices in the Kgalagadi area. Local communities were awarded land and resource rights both inside and outside the Kgalagadi Transfrontier park (KTP). This marked a significant step forward in conservation in the Kgalagadi area as communities then became co-owners of international parklands. Therefore, in this and other cases affecting national parks, SANParks has been tasked with co-managing the transferred land on behalf of the local communities as contractual parks. Given that some local communities are now co-owners of parks, they rightfully expect to share benefits with SANParks.

At the core of the potential of sharing benefits with local communities is to realise the value of recreation in the parks. Because the parks agency is currently ploughing almost all conservation fees back into conservation (SANParks, 2010), it would need to generate additional revenue for any benefit-sharing to be possible. A 1 % levy on all hotel reservations, earmarked for community projects, was introduced effective from 1 November 2012 (SANParks, 2013). However, this levy generates too little revenue to make a noticeable difference for the communities in question, and raising it to any noticeable extent would introduce the obvious risk of encouraging tourists to stay in hotels outside the parks so as to avoid the levy. Looking at the available options, we contemplate that the parks agency could generate more revenue by simply charging higher conservation fees to international visitors.

The argument here is that international tourists are willing to pay higher fees as they constitute a negligible fraction of their total costs and, unlike domestic tourists who partly subsidise parks through taxes, international tourist's only finance parks through conservation fees. While higher conservation fees would presumably lead some potential tourists to travel to parks in other countries instead, the fact that the fees are a very small portion of overall costs of travelling to South Africa suggests that such substitution will be limited and that substitution between different parks within South Africa will be more important.

In this spirit, the main objective of our research is to estimate the scope for increasing revenue from international visitors in order to fund benefit-sharing programmes at the KTP. These estimates are done with the help of the contingent behaviour (CB) methodology. The visitation demand functions will be estimated using experimental data generated from the CB survey conducted on visitors at KTP as well as Kruger, Augrabies Fall and Pilanesberg national parks (which were considered to be potential substitutes and/or complements for KTP). This is a valuation study, therefore: it asks international tourists who come to the park how they would respond to different hypothetical price levels.

The management problems faced by the KTP, with restitution already in place, differ from those of the other three parks. However, the common challenge faced not only by the four parks in this study, but by national parks around the world, is that of shrinking budgets. Thus, the solution presented in this study of charging appropriate gate fees at recreational sites in particular could be a potential source that may be used to generate additional revenue by the park agencies to offset the dwindling tax-based government funding. This paper contributes to empirical work on optimal park pricing by expanding on the scant literature on determination of optimal park prices using experimental data. Given the restitution, the fundamental question is how the co-ownership can be managed efficiently.

2. The Kgalagadi Transfrontier Park

For nature-based tourism in South Africa, there is a choice between national parks managed by SANParks with reasonable charges (low prices), nature reserves managed by provincial conservation agencies, and private game reserves which are often luxurious and offer exclusive game viewing and with somewhat higher prices. National parks, provincial nature reserves and private game reserves co-exist within the same broad system, and are to some extent substitutes. The fundamental difference is not in conservation but rather in the

tourist services they provide. This study's general focus is on KTP specifically, and SANParks managed national parks more generally, for a variety of reasons: they manage the majority of protected areas and get the most visitors; they get government funding, hence have social responsibilities; and they are largely the ones affected by land claims.

The KTP is located in the Kgalagadi District on the south-western border of Botswana and the Northern Cape border of South Africa. It can be accessed through five gates in three different countries, namely Botswana, Namibia and South Africa (SANParks, 2016). The park boasts an area of 3.8 million ha, making it one of the biggest conservation areas in the world (SANParks, 2006). The KTP is classified as a Category 2 park according to the International Union for Conservation of Nature and Natural Resources (IUCN) classification of protected areas (IUCN, 1994; Sandwith et al., 2001).

KTP only has two of the 'big five' large animals – desert lions and leopards. However, it is well known for its huge population of gemsbok and arid biodiversity. Kruger has all of these animals, has the biggest accommodation facilities, tarred roads and an international airport. The Kruger national park is the flagship of SANParks managed parks and by-far the largest park in South Africa. A visitor intercepted at Kruger is 1 500 km from KTP. The park has a wide variety of attractions comparable only with the best in Africa.

The close proximity of Augrabies Falls national park to the KTP is the reason its visitation is also of interest in this study. The main attraction is the 56 metre high Augrabies Falls, considered to be one of the most impressive falls in South Africa. SANParks managed parks offer a variety of lodging types, ranging from camping, huts, safari tents, bungalows, cottages, and guest houses to luxury lodges.

Although Pilanesberg Game Reserve is managed by the North West Parks and Tourism Board (NWPTB), it is of interest in this study given its popularity, status, similarity and location. We will refer to it as Pilanesberg National Park. The park is located in the crater of a long extinct volcano, and is the fourth biggest park in South Africa. It is also home to the 'big five', has world class accommodation, tarred roads and an airport nearby. The visitor usually sees all the parks in a few years' time.

The KTP encompasses part of the ancestral site of the Khomani San community. Following a successful land claim, this community and the adjacent Mier community were awarded land both inside and outside the KTP in May 2002. Since SANParks co-manages the

transferred land inside the park on behalf of the two communities, it is expected to do so in a way that generates revenue for the communities as well.[4]

The household income for the Khomani San is very low, while unemployment is high. They have not really benefitted from the land restitution (Dikgang & Muchapondwa, 2016), and are heavily dependent on natural resources (Dikgang & Muchapondwa, 2012). Therefore, conservation in the area may be threatened by the overexploitation of natural resources. To discourage this over-reliance, the parks agency urgently needs to generate benefits from tourism to share with the community. Furthermore, appropriate park pricing takes into account the correct economic value of park visitation because conservation fees are a proxy of the valuation placed on recreation by park visitors (Lee & Han, 2002).

In the literature on park fees, *optimal* fee setting, referring to the maximisation of revenue – or, ideally, profit – is seen as a goal for fees charged to international tourists, but not usually those charged to their domestic counterparts. This Optimal fee setting also seems appropriate from the perspective of financing benefit-sharing programmes. Given that the Khomani San are generally poorer than visitors to the park, increasing fees for domestic visitors may be desirable, but this could have distributional implications within the country and would complicate matters. Increasing fees for foreign visitors, on the other hand, has no problematic distributional impacts within the country as long as such higher fees lead to more funds becoming available to SANParks and the targeted community. This study therefore sought to estimate what fee level would maximise the revenue from international visitors so as to maximise the funds that could be used for benefit-sharing with local communities.

3. Related literature

There is an extensive literature on park user fees. The literature covers issues such as optimal pricing and revenue-maximising pricing via the Contingent Valuation and Travel Cost Methods, among others (see Buckley, 2003; Hughes & Carlsen, 2011; Subadea and Franciscob, 2014; Pandita, Dhakalb and Polyakovc, 2015; Voltaire, 2017). Although many studies have

[4] The discussion from here on deals only with the Khomani San community, who San are more dependent on natural resources in the park and broader area, and who interact more directly with nature. They manage their land restitution and resource use affairs communally in line with their tradition. The local municipality manages the affairs of the Mier community.

been undertaken on visitors' preferences for national parks, most have focused on estimating visitors' willingness to pay for the recreational experience in an attempt to measure the value assigned to national parks.

Most of the studies conducted on setting park fees reveal that the actual conservation fees currently being charged to park visitors are significantly below what such visitors are willing to pay; moreover, the fees are below what is required to cover operational costs (see e.g. Ågren et al., 2003; Andersson et al., 2005; Lal et al. 2017; Naidoo & Adamowicz, 2005). In particular, studies undertaken in developing countries reveal that the entrance fee charged in national parks is often substantially lower than what visitors are prepared to pay (Dixon & Sherman, 1991; Bird, 1992; Whitelaw et al., 2014; Dikgang and Muchapondwa, 2016). This implies that most parks visits are under-priced. Such a perverse outcome suggests that relatively poor countries are subsidising the visits of people from developed nations, who make up the majority of visitors at national parks in most developing countries.

However, in order to determine the revenue-maximising conservation fees to be charged at any specific national park, one needs to know the visitor's preference for visiting that park or any other substitute or complementary parks. This information can be extracted from the visitation demand functions of national parks. Visitation demand functions can be estimated based on historical or experimental data.

To the best of our knowledge, only the study by Alpízar (2006) used historical data to compute optimal entrance fees – in his case, for national parks in Costa Rica. Similarly, very few studies have attempted to estimate revenue-maximising conservation fees using experimental data (for studies that do so, see e.g. Chase et al., 1998; Naidoo & Adamowicz, 2005).

A growing number of studies in recreational demand models use the Contingent Behaviour Method (CBM) in order to predict quantities under hypothetical scenarios (Grijalva et al., 2002). The CBM asks those who come to the park what they would do under hypothetical circumstances (with varying prices). The technique makes it possible to generate variation in conservation fees by asking respondents – park visitors in this case – how they would vary their visitation rates (e.g. the number of days spent visiting a specific park in a year) if the conservation fees were to be increased by any specified amount at that or any other park.

Chase et al. (1998) used the CBM to investigate the revenue-maximising entrance fees for Costa Rican national parks. Using a similar approach, a study by Naidoo and Adamowicz

(2005) simulated fee increases and estimated entrance fees that maximised tourism revenue to the Mabira Forest Reserve in Uganda. The determination of revenue-maximising fees using experimental data adds value to research on park pricing as it can be designed to mimic the real market. Furthermore, introducing substitutes embraces micro theory in a richer fashion.

Compared with imposing a single conservation fee, price discrimination not only has the potential of increasing revenue, but also satisfies equity issues from a social point of view and brings about local community stability. Price discrimination among users can enable resource use in different sites, among different time periods, and among different user profiles (South African residents and international tourists).

These differences are reflected in the differences in individual visitors' visitation demand functions and price elasticities of demand. Own- and cross-price elasticities are critical components of a national parks' pricing policy. Thus, revenue-maximising park pricing is dependent on the reliability of the demand elasticities (Chase et al., 1998). The parks agency is able to engage in price discrimination because the market can be segmented relatively easily, which enables visitors with varying elasticities of demand to be identified and treated differently.

Estimating how high to make the KTP's conservation fees is important as it may contribute toward developing effective pricing strategies in the context of South Africa's national park system. This study is critical, therefore, as it suggests ways to set conservation fees at revenue-maximising levels for the benefit of local communities surrounding parks, who often incur the highest cost of conservation and yet experience the least of its benefits (Mendes, 2003). In contrast, international tourists do not incur the cost of conservation and yet experience the most benefits; hence, it is vital that they are charged revenue-maximising fees.

4. The Contingent Behaviour Method

For the purposes of this study, the CBM is considered the most appropriate due to its ability to consider substitution effects when generating experimental data for estimating visitation demand functions. This paper adopts the CBM formulation by Chase et al. (1998) to estimate what revenue-maximising conservation fees could be charged to international visitors to the KTP and to three other South African parks.

In a CBM setting, the park visitor is assumed to maximise a utility function $u = U(X, Q)$, subject to the budget constraint $P_X X + P_Q Q = M$, where X is a vector of private goods, Q

represents the recreational goods (i.e. visits[5] to South African parks), P_X is a vector of market prices of private goods, P_Q is the vector of virtual prices of recreational goods (i.e. conservation fees), and M is the individual's disposable income (see e.g. Freeman, 1993). Solving the maximisation problem gives a set of Marshallian demand functions, and the aggregation of these demand functions yields a market demand function for Q: $Q = Q(M, P_X, P_Q)$. The symmetrical demand functions for each of the – in this case, four – parks can be written as:

$$Q_i = f(P_1, P_2, P_3, P_4; M; Z), \quad \textbf{(1)}$$

where Q_i is the park visitation rate (e.g. days per year) by international tourists at park i; P_i is the conservation fee at park i; M is the tourist's disposable income; and Z captures the socio-economic and trip-related characteristics (Chase et al., 1998).[6] The visitation demand functions for the parks will be estimated using experimental data generated from the contingent behaviour survey conducted on visitors at the KTP as well as the Kruger, Augrabies Falls and Pilanesberg National Parks, which were considered as substitutes for or complements to the KTP.

Table 1 shows an example of the charts used by the authors to capture data regarding visitors' responses to actual and hypothetical own- and cross-price scenarios at the parks concerned.

(Table 1 about here)

The respondents were shown the chart with a blank piece of paper covering all but the first block of three columns. The respondents were asked, "During your current trip, for how many days will you visit the KTP at the current daily entrance fee of R180[7] (US$22.93) per person per day?" The question was repeated for the Kruger, Augrabies Falls and Pilanesberg

[5] Number of total visits to the park for the past five years.
[6] The demand function represented by equation (1) assumes that individuals allocate their disposable income between recreational goods and a composite commodity with a numeraire price.
[7] US$ 1 = South African Rand (R) 7.85 at the time the paper was written. The payments are in 2011 values.

National Parks. The 2016[8] daily conservation fee for the KTP was R280 (US$18.05). With favourable exchange rates for many international currencies, South Africa has become an inexpensive destination as park conservation fees are quoted in Rands.

After the participant had specified the number of days s/he had spent in each park in the relevant column provided, the interviewer explained that a set of hypothetical questions would follow in which the fee would be raised at only one park. The first hypothetical question raised the entrance fee at the KTP only. The interviewer therefore asked the following: "If the fee were increased to w_j Rands only at the KTP, how would that affect your plans to visit the KTP and the other parks (Kruger, Augrabies Falls and Pilanesberg)?" The second to fourth hypothetical questions analogously raised the entrance fees at Kruger, Augrabies Falls and Pilanesberg, respectively.

Even though each respondent answered visitation questions about five entrance fee plans (actual fee, hypothetical fee 1, hypothetical fee 2, hypothetical fee 3, hypothetical fee 4), the hypothetical price plans have to vary across respondents in order to generate sufficient variability for estimable demand functions. In other words, different groups of respondents had to answer hypothetical price plan questions about different fee levels.

Both with the actual and the hypothetical fees, a number of respondents said that they had not visited or would not visit all parks. For several observations, then, the number of days spent in a park was 0; of course, there were no observations where the number of days spent was less than 0. Thus, care needs to be taken in the statistical analysis because the dependent variables – the number of days spent in each respective park – are truncated at 0. Because this meant ordinary linear regression methods would be unsuitable, we used a fixed-effects Tobit Model instead (see e.g. Greene, 2011, for a description of this estimation method).

5. Descriptive statistics

A face-to-face questionnaire survey was conducted with randomly selected park visitors at the four parks. Only one person per traveling group was interviewed. These respondents were either park-goers or those who had already paid to get to the park. The survey was conducted from Monday to Sunday during March and April 2011. Due to the vast size of the

[8] The 2016 exchange rate, based on an average of the January to April monthly average, was US$1 = R15.51 at the time of writing; the Rand has depreciated sharply against most foreign currencies since the study was conducted.

four parks, the surveys were mainly carried out at the gates, at accommodation facilities, or at designated rest areas inside each park. At the different accommodation facilities, both camping and chalets were included. At the designated rest areas inside the parks, respondents were asked whether they were overnight or day visitors. Day visitors were excluded from the sample. Visitors who had already paid to get to the park were interviewed at the gates. Targeting different accommodations increased the response rate and the representativeness of the final sample.

The survey canvassed a total of 463 overnight visitors, of whom 78 international overnight visitors whose responses were used for the analysis presented here.[9] Owing to the experimental process utilised, the data gathered on park demand preferences resulted in a data set consisting of five observations for each of the 78 respondents for each park. Thus, for data analysis, we have 390 observations to work with for each park. Approximately 63 percent of our sample originates from the top five markets. The remainder is from other Western Countries with Australian tourists accounting for around 13 percent of the whole sample. Our sample composition is in line with the visitor profile at national parks in South Africa, where international visitors account for a relatively small share of total visits. Nonetheless, although our sample size for international tourists was small, given their significant revenue contribution they offer valuable lessons in respect of their elasticity of demand, price and time.

(Table 2 about here)

On average, the respondents interviewed visited national parks about 1.67 times each. Our data show that the majority of international respondents (59.44%) were first-time tourists. The data also indicate that most international visitors to national parks did not make use of travel agency services, with the exception of visitors to Pilanesberg National Park. A slight majority – about 51.1% – of international visitors visited other recreational sites during their trips as well.

[9] Although SANParks distinguishes between three categories of visitors, our sample only consists of domestic (i.e. South African) and international visitors. We did not get any respondents from the SADC region. This is expected since visits from SADC residents make up a very small proportion of total visits. Furthermore, South African national parks cater to both day and overnight visitors, and charge the same conservation fees for both categories.

It seems that park visitors feel strongly about the institution that manages the revenues with international visitors of the view that the park agency is well placed to manage this scheme better with raised fee mechanism being their favoured mechanism, with the exception of visitors to Kruger Park. On average, international visitors stayed at the parks for 4.22 nights each. Around 64% of the respondents were male and 36% were female. The findings also show that the average international visitor who enjoys national parks around South Africa is approximately 51 years old, and has an average household size of about 2.93.

Furthermore, we carried out statistical two-tailed tests assuming unequal variances and a 5 percent significance level to assess the magnitudes of the stated mean WTP preferences between the two hypothetical scenarios. We conclude from these tests that the difference between "raised fee" and "voluntary donation" WTP is statistically significant only for local visitors in Kruger and Augrabies.

6. Empirical results

The data gathered on park demand preferences resulted in a data set consisting of five observations for each of the 78 respondents. The estimates make use of a random effects Tobit regression with a log-linear model. Table 3 presents the results of this estimation to analyse factors[10] that determine visitation demand by international tourists, based on the contingent-behaviour-generated experimental data at the four parks concerned.

(Table 3 about here)

The relationship between price elasticity and total revenue is critical as it helps to inform managers when making pricing decisions for a good or service. When something like price changes in a market, elasticity tells us how other things will change. *Price elasticity* tells us how much of an impact a change in price will have on the park visitor's willingness to visit the park. Economic theory predicts that there is an inverse relationship between price and quantity demanded, i.e. the law of demand states that the quantity demanded of the good or service

[10] The survey included measures of attitudinal variables; however, since these did not add significant explanatory power, they are excluded from the results reported here.

decreases as its price increases. This is indeed the case in this study, as the own-price estimates at all four parks in question were negatively signed. However, the own-price estimates for Kruger and Augrabies Falls were not statistically significant. This suggests that park guests at Kgalagadi and Pilanesberg are more sensitive to changes in conservation fees. The negatively signed and significant Kgalagadi and Pilanesberg own-price elasticities imply that raising conservation fees at these parks would result in lower revenues generated by them, as tourists would visit either less frequently or not at all, *ceteris paribus*.

Another finding is that the visitation demand at Kgalagadi is sensitive to fee changes in Kruger. The positive Kruger coefficient implies that it is a substitute and that increased fees at Kruger would increase the number of visitors to KTP. Interestingly, fee increases in the other two parks would have no impact on the revenue generated by the KTP. Our discussions demonstrate that price elasticity of demand and total revenue are closely interrelated. Thus, it is vital for managers to know whether their product or services have inelastic or elastic demand. It is equally vital to know about cross-price elasticity. Both own-price and cross-price elasticity estimates can be used to improve pricing strategies.

It should be noted that, although we may seem to attempt to explain visitation demand with pricing alone, other factors are, of course, also at play – including the park's proximity to the visitor's country of origin, as well as the park's branding, its image and its positioning in the tourism market. Many international guests seem to visit protected areas in other parts of the world quite regularly, and incur high travel costs in doing so. This in turn suggests they could tolerate significant price increases because of their desire to experience the unique African wilderness. Thus, international visitors are more likely to be willing to pay higher conservation fees in the presence of transparency, i.e. if they know how their fees are used, and why. In fact, visitors who used tour packages – where the pricing of individual components is far less transparent – were generally willing to pay less.

Another critical issue is the inclusion of covariates because these can improve parameter estimation. With respect to income levels, for example, given that international visitors have already incurred high travel expenses, it is perhaps unsurprising that this variable did not influence visitation demand at any of the four parks in the study. A closer look at socio-economic characteristics shows that the multi-trip variable is both negative and significant at Kgalagadi and Augrabies. The fact that the latter is the closest park to the former makes this result logical. The education coefficient is positive and significant only at the Kgalagadi.

Perhaps highly educated tourists are more aware of the fragile desert ecosystem in the KTP, and hence education influences demand for this particular park. Gender (male dummy) is negative and significant only at the KNP. The region that the tourist is from is also of no importance in terms of influencing visitation demand at any of the parks. Again, this perhaps comes as no surprise, given the popularity of South African national parks internationally.

Using the elasticities estimated in the random effects Tobit Model, we solved for the revenue-maximising daily conservation fees reported in Table 4. We follow the same approach adopted by Dikgang and Muchapondwa (2016), namely of using the Marshallian theory of price elasticity of demand in determining the price-quantity points at which revenue is maximised. The standard result from economic theory is that the parks agency can maximise revenue by setting the conservation fee at a level where the park visitation demand has unitary elasticity.

(Table 4 about here)

The results above indicate that the fees could be raised substantially at the four parks involved in the study.[11] Our revenue-maximising fee estimates are significantly higher than the current fees charged to international visitors at these four parks. Given that the KTP had approximately 5 500 international visitors in 2011 (excluding the approximately 1 500 Wild Card[12] guests who do not pay separately to the KTP), our proposed scheme would have raised R5.2 million (US$662 420.00) in 2011[13]. This is significantly higher than the Khomani San community's current total income. This amount is equivalent to US$335 267.57 in current-day (i.e. 2016) terms, which is still significantly more than the community's current total income. Thus, even if international visitors respond to changes in the Rand price rather than the price

[11] A point to note is that Pilanesberg charges a weekly rate; hence, our estimate reflects the revenue-maximising weekly fee. In the case of other parks, we estimate daily revenue-maximising conservation fees.
[12] Wild Card members pay an annual membership fee that entitles them to free entrance at any natural reserve under SANParks' jurisdiction.
[13] You cannot simply take the difference in fees and multiply it by the total number of visitors as of course the number of visitors would drop albeit not massively if the fees were raised. If fees were implemented, it is estimated that the KTP visitation numbers would drop by 4 percent, which is very little.

in international currency, our proposed price scheme would still double the community's income.

Realistically, most international visitors respond to changes in the US Dollar price rather than the Rand price, in which case the revenue-maximising fee could be set even higher, and thus generate even more income for the community. If SANParks were to impose conservation fees denominated in hard currency such as the US Dollar on international tourists (as in Botswana, Kenya, Namibia, Tanzania and Zimbabwe), then this scheme could generate even more park revenue. A hard-currency-denominated pricing strategy is of more benefit to developing countries, since hard currencies are relatively stable, i.e. their value does not change very much. In contrast, developing countries have soft currencies, suggesting that their value often trends downward. Therefore, with our proposed hard-currency-denominated conservation fees, one could expect that, when the value of developing countries' currencies goes down (as the South African Rand's often does), the revenue generated from international tourists would rise in domestic currency terms.

A conversion of our estimates to US Dollars appears to yield reasonable conservation fees, comparable to those of similar recreational sites in Africa. For example, international visitors pay up to US$50 per night at some recreational sites in Botswana and Zimbabwe.

7. Conclusion

Our findings imply that the conservation fees currently charged to international visitors are significantly lower than what is required to maximise revenues generated by the park. Interestingly, an overwhelming number of international visitors were not aware of conservation fees to the park: such costs are hidden in tour packages and in the prices of guide services. When asked what they thought the conservation fees were, most international tourists gave amounts higher than the current fees. This is further proof not only of the undervaluation of South Africa's national parks, but also of international tourists' willingness to pay more to visit them.

Tourism is seasonal in most parts of the world. In the case of international visitors, it is driven, among other factors, by weather conditions in their home country and by their destination. Thus, future research should try to estimate revenue-maximising conservation fees taking tourism seasonality into account.

However, even if such seasonality is disregarded and fees continue to be kept constant throughout the year, our study indicates that there is substantial scope for increasing the benefits to South African society from international tourists visiting its national parks. If the fees at the KTP are raised to their revenue-maximising levels, and the extra proceeds are earmarked for benefit-sharing with the local Khomani San community, our results indicate that the community's annual income would more than double as a result. Increasing fees at other South African parks and earmarking the proceeds in a similar fashion would presumably have similar impacts. This scheme has a potential to generate even more revenue for both beneficiary parties if SANParks were to start charging international tourists in foreign-denominated currencies such as the US Dollar.

Given that international visitors are likely to be accustomed to contributing donations in their respective countries at recreational sites (such as museums), the introduction of voluntary donations has the potential to contribute significantly. Given that the park has well-established infrastructure to help communities extract more benefits for their participation in conservation, this study demonstrates that there is a possibility of generating more revenue from conservation fees for sharing with the new but poor co-owners of international parklands. If such opportunities exist, then the modes of making tourists pay more can vary, and may include for example the introduction of a levy on daily entrance fee to the national park, earmarked for community projects. The introduction of the 1% levy on all accommodation is a good practical example that shows that such mechanisms are feasible.

Acknowledgements. We are grateful to Louise Swemmer, Wendy Annecke and Joep Stevens of SANParks (South African National Parks) for assistance with data and materials. Funding from ERSA (Economic Research Southern Africa), FORMAS through its COMMONS programme and Sida (Swedish International Development Cooperation Agency) through its Environment for Development programme is gratefully acknowledged. An earlier version of

this article appears as ERSA *Working Paper 393.* Sandie Fitchat provided valuable help with language editing. The usual disclaimers apply.

References

Ågren, J., Nyyssölä, C., & Stage, J. (2003). The potential for monopoly rents from Etosha National Park, Namibia. *South African Journal of Economic and Management Sciences*, 6, 459–472.

Alpízar, F. (2006). The pricing of protected areas in nature-based tourism: A local perspective. *Ecological Economics*, 56, 294–307.

Andersson, P., Croné, S., Stage, J. & Stage, J. (2005). Potential monopoly rents from international wildlife tourism: An example from Uganda's gorilla tourism. *Eastern Africa Social Science Research Review*, 21, 1–18.

Bird, R, M. (1992). Pay to play in parks: An Australian policy perspective on visitor fees in public protected areas. *World Development, 20 (8)*, 1145-1158.

Buckley, R. (2003). Pay to play in parks: An Australian policy perspective on visitor fees in public protected areas. *Journal of Sustainable Tourism*, 11, 56–73.

Chase, C., Lee, D. R., Schulze, W. D., & Anderson, D. J. (1998). Ecotourism demand and differential pricing of national park access in Costa Rica. *Land Economics*, 74, 466–482.

Dikgang, J., & Muchapondwa, E. (2012). The valuation of biodiversity conservation by the South African Khomani San 'bushmen' community. *Ecological Economics*, 84, 7–14.

Dikgang, J., & Muchapondwa, E. (2016). The determination of park fees in support of benefit sharing in Southern Africa. *Tourism Economics DOI: 10.1177/1354816616655254: 1 - 19*.

Dikgang, J., & Muchapondwa, E. (2016). The effect of land restitution on poverty reduction among the Khomani San 'bushmen' in South Africa. *South African Journal of Economics*, 84, 63–80.

Dixon, J. A., & Sherman, P. B. (1991). Economics of protected areas. *Ambio, 20(2),* 68e74. DNPWC.

Freeman III, A. M. (1993). *The measurement of environmental and resource values: Theory and methods*. Washington, DC: Resources for the Future.

Greene, W. H. (2011). *Econometric analysis* (7th ed.). London: Pearson.

Grijalva, T. C., Berrens, R. P., Bohara, A. K., & Shaw, W. D. (2002). Testing the validity of contingent behavior trip responses. *American Journal of Agricultural Economics*, 84, 401–414.

Hughes, M. & Carlsen, J. (2011). National park user pays systems in Australia: Cost recovery vs access for all? *Journal of Tourism and Leisure Studies*, 17, 129–146.

IUCN/International Union for Conservation of Nature and Natural Resources. (1994). *Guidelines for protected area management categories*. IUCN Commission on National Parks and Protected Areas with the assistance of the United Nations Environment Programme World Conservation Monitoring Centre. Gland/Cambridge: IUCN.

Lal, P., Woldeb, B., Masozerac, M., Burlib,P., Alavalapatid, J., Ranjane, A., Montambaultf, J., Banerjeeg, O., & Ochuodhoh, T. (2017). Valuing visitor services and access to protected areas: The case of Nyungwe National Park in Rwanda. *Tourism Management, 61,* 141–151.

Lee, C., & Han, S. (2002). Estimating the use and preservation values of national parks' tourism resources using a contingent valuation method. *Tourism Management*, 23, 531–540.

McKinsey & Company. (2002). *SANParks and McKinsey Final Meeting Report, following strategic review*. Skukuza: SANParks.

Mendes, I. (2003). Pricing recreation use of national parks for more efficient nature conservation: An application to the Portuguese case. *European Environment*, 13, 288–302.

Naidoo, R., & Adamowicz, W. L. (2005). Economic benefits of biodiversity exceed costs of conservation at an African rainforest reserve. *Proceedings of the National Academy of Sciences*, 102, 16712–16716.

Pandita, R., Dhakalb, M., & Polyakovc, M. (2015). Valuing access to protected areas in Nepal: The case of Chitwan National Park. *Tourism Management, 50,* 1–12.

Sandwith, T., Shine, C., Hamilton, L., & Sheppard, D. (2001). Transboundary Protected Areas for Peace and Co-operation. Gland/Cambridge: IUCN.

SANParks/South African National Parks. (2006). *Developing a system for sustainable resource use by the Khomani San in Kgalagadi Transfrontier Park and environs: Potential project themes*. Pretoria: SANParks.

SANParks/South African National Parks. (2010). *South African National Parks Conservation Fees*. Retrieved from http://www.places.co.za/html/parks_conservation_fees.html, 5 May 2010.

SANParks/South African National Parks. (2016). South African National Parks Annual Reports 2015/16. Retrieved from https://www.sanparks.org/assets/docs/general/annual-report-2016.pdf. 20 February 2017.

SANParks/South African National Parks. (2013). South African National Parks (SANParks) Annual Report 2012/13. Retrieved from https://www.sanparks.org/assets/docs/general/annual-report-2013.pdf, 20 February 2017.

Subadea, R.F., & Franciscob, H.A. 2014. Do non-users value coral reefs?: Economic valuation of conserving Tubbataha Reefs, Philippines. *Ecological Economics, 102*, 24–32.

Whitelaw, P. A., King, B. E. M., & Tolkach, D. (2014). Protected areas, conservation and tourism - Financing the sustainable dream. *Journal of Sustainable Tourism, 22(4),* 584e603.

Voltaire, L. 2017. Pricing Future Nature Reserves through Contingent Valuation Data. *Ecological Economics, 135*, 66–75.

Table 1: Sample of the Contingent Behaviour Method chart used for international tourists

Name of park	**Actual visit**		**Hypothetical visits**							
	Fee (US$)	***No. of days***	***Fee (US$)***	***No. of days***	***Fee (US$)***	***No. of days***	***Fee (US$)***	***No. of days***	***Fee (US$)***	***No. of days***
Kgalagadi Transfrontier Park	22.93		28.66		22.93		22.93		22.93	
Kruger National Park	22.93		22.93		28.66		22.93		22.93	
Augrabies Falls National Park	12.74		12.74		12.74		15.92		12.74	
Pilanesberg[14] National Park	5.73		5.73		5.73		5.73		7.17	

NB: The payments are in 2011 values. Note that the South African Rand has lost approximately half its value against the US Dollar. Therefore, the 2016 current-day fees in US Dollars are nearly half those given in Table 1.

[14] In addition to the gate fee shown above, Pilanesberg charges R20 (US$2.55 at the 2011 exchange rate) for each car that goes inside the reserve.

Table 2: A selection of descriptive statistics for international overnight visitors interviewed

Variable	Kgalagadi National Park	Kruger National Park	Augrabies Falls National Park	Pilanesberg National Park
N	19	32	21	6
Visit frequency to parks	1.79 (1.48)	1.69 (1.26)	1.86 (1.56)	1.33 (0.76)
First visit	52.63% (50.20%)	37.50% (48.56%)	80.95% (39.46%)	66.67% (47.95)
Travel agent	26.32% (44.27%)	21.88% (41.47%)	47.62% (50.18%)	0% (0%)
Multi-trip	36.84% (48.49%)	43.75% (49.76%)	90.48% (29.50%)	33.33% (47.95%)
Household size	2.47 (0.76)	3.34 (2.40)	3.24 (1.91)	2.67 (0.76)
Actual fee paid	R180.00 (R0.00)	R180.00 (R0.00)	R100.00 (R0.00)	R45.00 (R0.00)
Daily actual household/group fee (excluding annual wild card pass)	R753.00 (R768.90)	R682.97 (R667.82)	R580.24 (R802.49)	R50.37 (R32.52)
Total fee expenses	R1 718.95 (R1 011.59)	R2 331.25 (R1 865.34)	R804.05 (R937.44)	R196.67 (R108.90)
Fair fee	R171.58 (R80.84)	R170.63 (R75.60)	R93.81 (R26.76)	R 80.83 (R57.79)
WTP Over and Above Actual Fee Paid:				
Raised Fee	R88.16 (R112.51)	R81.25 (R147.57)	R45.24 (R44.28)	R60 (R97.63)
Voluntary Donation	R76.32 (R101.35)	R89.84 (R153.68)	R41.67 (R46.73)	R35 (R34.61)
No Visit Fee	R286.32 (R 121.61)	R322.42 (R153.44)	R274.29 (R159.12)	R158.33 (R77.11)
Accommodation costs	R1 726.05 (R1 790.26)	R4 835.78 (R4 242.48)	R2352.95 (R2 279.30)	R 2 774.33 (R3 009.46)
Total trip costs	R17 404.00 (R19 626.94)	R21 780.00 (R15 234.33)	R11 885.24 (R7 144.41)	R 10 056.67 (R9 738.09)
Household annual income	R281 578.90 (R217 132.30)	R325 312.50 (R240 985.10)	R197 142.90 (R197 170.90)	R282 500.00 (R139 850.60)
Actual number of nights	3.79 (1.80)	6.06 (6.07)	1.71 (1.04)	5.33 (2.67)
Number of nights respondent would have spent if there had been no fee	4.79 (2.85)	6.88 (7.27)	1.95 (1.53)	6 (1.86)
Number of nights at increased fee	3.94 (1.93)	5.23 (5.91)	1.6 (0.94)	5.13 (2.76)

Age (years)	49.42 (12.12)	48.03 (16.68)	52.62 (15.62)	54.33 (14.61)
Share of male respondents	68.42% (46.73%)	56.25% (49.76%)	47.62% (50.18%)	83.33% (37.90%)

Note: Standard deviations in parentheses

Table 3: Random effects Tobit Model results in respect of the demand for visits to parks by international visitors

Variable	Estimates: Coefficient			
	Kgalagadi Transfrontier Park	**Kruger National Park**	**Augrabies Falls National Park**	**Pilanesberg National Park**
Price – Kgalagadi (R/night)	-.568*** (.186)	-.332 (.223)	-.113 (.141)	-.155 (.132)
Price – Kruger (R/night)	.711*** (.127)	-.217 (.152)	-.636*** (.097)	-.022 (.091)
Price – Augrabies (R/night)	.218 (.184)	-1.566*** (.220)	-.043 (.140)	.029 (.130)
Price – Pilanesberg (R/night)	.235 (.166)	-.092 (.199)	-.123 (.126)	-.348*** (.118)
Income (R)	-.076 (.089)	.111 (.096)	.024 (.095)	.163 (.162)
Age (years)	-.236 (.330)	-.023 (.354)	-.496 (.352)	-.670 (.598)
No. of household members on trip	-.221 (.187)	-.111 (.200)	-.202 (.199)	.372 (.339)
Multi-trip	-.716*** (.218)	-.181 (.234)	-.871*** (.232)	-.183 (.395)
Male dummy	-.211 (.202)	-.435** (.217)	-.113 (.215)	.042 (.367)
Education (years)	.165** (.083)	-.064 (.089)	.135 (.088)	.219 (.150)
Asia	.335 (.261)	.175 (.280)	.171 (.278)	-.025 (.474)
The Americas	-.182 (.323)	-.179 (.347)	-.271 (.345)	-.180 (.587)
Oceania	-.110 (.353)	-.612 (.379)	.1304 (.376)	-.261 (.639)
Constant	.204 (3.054)	12.110*** (3.508)	6.35** (2.717)	1.819 (3.820)
Log-likelihood	-506.555	-569.557	-424.955	-443.914
Wald $chi^2(10)$	84.85	68.58	71.19	25.13
No. of observations	390	390	390	390

Source: Field survey, 2011

* p<0.1; ** p<0.05; *** p<0.01; standard errors in parentheses

Table 4: Various conservation fee options for international park visitors in 2011 South African Rand (R) and 2011 US Dollars (US$), unless otherwise specified

		Kgalagadi Transfrontier Park	**Kruger National Park**	**Augrabies Falls National Park**	**Pilanesberg National Park**
Revenue-maximising fee	R	1 131.94	575.67	722.95	634.11
	US$	144.20	73.33	92.10	80.78
	US$ 2016 values	72.98	38.38	48.20	42.27
2011 conservation fee	R	180.00	180.00	100.00	45.00
	US$	22.93	22.93	12.74	5.73
	US$ 2016 values	12.00	12.00	6.67	3.00
2016 (current-day) conservation fee	R 2016 values	280.00	280.00	160.00	65.00
	US$ 2016 values	18.05	18.05	10.32	4.19

Source: Field survey (2011) and own computation